## SPECIFICATION AMENDMENTS

Please amend paragraph **[0051]** as follows:

**[0051]** The output leads of photonic burst switches $32_1$-$32_B$ are connected to optical multiplexers $34_1$-$34_A$. For example, photonic burst switch $32_1$ has *A* output leads connected to input leads of optical multiplexers $34_1$-$34_A$ (*i.e.*, one output lead of photonic burst switch $32_1$ to one input lead of each optical multiplexer). Each optical multiplexer also an input lead connected to an output lead of electrical-to-optical signal converter 38. Control unit 37 has an input lead or port connected to the output lead or port of optical-to-electrical signal converter 36. The output leads of control unit 37 are connected to the control leads of photonic burst switches $32_1$-$32_B$ and electrical-to-optical signal converter 38. As described below in conjunction with the flow diagram of Figure 5, module 17 is used to receive and transmit optical control bursts, optical data bursts, and network management control bursts. In one embodiment, the optical data bursts and optical control bursts have transmission formats as shown in ~~Figures 4A and 4B~~ Figures 4 and 5.

Please amend paragraph **[0052]** as follows:

**[0052]** ~~Figure 4A~~ Figure 4 illustrates the format of an optical data burst for use in PBS network 10 (Figure 1), according to one embodiment of the present invention. In this embodiment, each optical data burst has a start guard band 40, an IP payload data segment 41, an IP header segment 42, a payload sync segment 43 (typically a small number of bits), and an end guard band 44 as shown in Figure 4A. In some embodiments, IP payload data segment 41 includes the statistically-multiplexed IP data packets or Ethernet frames used to form the burst. Although Figure 4A shows the payload as contiguous, module 17 transmits payloads in a TDM format. Further, in some embodiments the data burst can be segmented over multiple TDM channels. It should be pointed out that in this embodiment the optical data bursts and optical control bursts have local significance only in PBS network 10, and may loose their significance at the optical WAN.

Please amend paragraph **[0053]** as follows:

**[0053]** ~~Figure 4B~~ <u>Figure 5</u> illustrates the format of an optical control burst for use in photonic burst switching network 10 (Figure 1), according to one embodiment of the present invention. In this embodiment, each optical control burst has a start guard band 46, an IP label data segment 47, a label sync segment 48 (typically a small number of bits), and an end guard band 49 as shown in ~~Figure 4B~~ <u>Figure 5</u>. In this embodiment, label data segment 45 contains all the necessary routing and timing information of the IP packets to form the optical burst. Although ~~Figure 4B~~ <u>Figure 5</u> shows the payload as contiguous, in this embodiment module 17 transmits labels in a TDM format.

Please amend paragraph **[0055]** as follows:

**[0055]** ~~Figure 5~~ <u>Figure 6</u> illustrates the operational flow of module 17 (Figure 3), according to one embodiment of the present invention. Referring to Figures 3 and [[5]]<u>6</u>, module 17 operates as follows.

Please amend paragraph **[0056]** as follows:

**[0056]** Module 17 receives an optical signal with TDM label and data signals. In this embodiment, module 17 receives an optical control signal (*e.g.*, an optical control burst) and an optical data signal (*i.e.*, an optical data burst in this embodiment) at one or two of the optical demultiplexers. For example, the optical control signal may be modulated on a first wavelength of an optical signal received by optical demultiplexer $30_A$, while the optical data signal is modulated on a second wavelength of the optical signal received by optical demultiplexer $30_A$. In some embodiments, the optical control signal may be received by a first optical demultiplexer while the optical data signal is received by a second optical demultiplexer. Further, in some cases, only an optical control signal (*e.g.*, a network management control burst) is received. A block [[51]]<u>601</u> represents this operation.

Please amend paragraph **[0057]** as follows:

**[0057]** Module 17 converts the optical control signal into an electrical signal. In this embodiment, the optical control signal is the optical control burst signal, which is separated from the received optical data signal by the optical demultiplexer and sent to

optical-to-electrical signal converter 36. In other embodiments, the optical control signal can be a network management control burst (previously described in conjunction with ~~Figure 4B~~ Figure 5). Optical-to-electrical signal converter 36 converts the optical control signal into an electrical signal. For example, in one embodiment each portion of the TDM control signal is converted to an electrical signal. The electrical control signals received by control unit 37 are processed to form a new control signal. In this embodiment, control unit 37 stores and processes the information contained in the control signals. A block [[53]]603 represents this operation.

Please amend paragraph **[0058]** as follows:

**[0058]** Module 17 then routes the optical data signals (*i.e.*, optical data burst in this embodiment) to one of optical multiplexers $34_1$-$34_A$, based on routing information contained in the control signal. In this embodiment, control unit 37 processes the control burst to extract the routing and timing information and sends appropriate PBS configuration signals to the set of *B* photonic burst switches $32_1$-$32_B$ to re-configure each of the photonic burst switches to switch the corresponding optical data bursts. A block [[55]]605 represents this operation.

Please amend paragraph **[0059]** as follows:

**[0059]** Module 17 then converts the processed electrical control signal to a new optical control burst. In this embodiment, control unit 37 provides TDM channel alignment so that reconverted or new optical control bursts are generated in the desired wavelength and TDM time slot pattern. The new control burst may be modulated on a wavelength and/or time slot different from the wavelength and/or time slot of the control burst received in block [[51]]601. A block [[57]]607 represents this operation.

Please amend paragraph **[0060]** as follows:

**[0061]** Module 17 then sends the optical control burst to the next switching node in the route. In this embodiment, electrical-to-optical signal generator 38 sends the new optical control burst to appropriate optical multiplexer of optical multiplexers $34_1$-$34_A$ to achieve the route. A block [[59]]609 represents this operation.

Please amend paragraph **[0090]** as follows:

**[0090]** In accordance with further aspects of the invention, label space architecture in an extended GMPLS-based framework for a PBS network is provided. An overview of a GMPLS-based control scheme for a PBS network in which the label space architecture may be implemented in accordance with one embodiment is illustrated in Figure 9. Starting with the GMPLS suite of protocols, each of the GMPLS protocols can be modified or extended to support PBS operations and optical interfaces while still incorporating the GMPLS protocols' various traffic-engineering tasks. The integrated PBS layer architecture include PBS data services layer 900 on top of a PBS MAC layer 901, which is on top of a PBS photonics layer 902. It is well known that the GMPLS-based protocols suite (indicated by a block 903 in Figure 9) includes a provisioning component 904, a signaling component 905, a routing component 906, a label management component 907, a link management component 908, and a protection and restoration component 909. In some embodiments, these components are modified or have added extensions that support the PBS layers 900-902. Further, in this embodiment, GMPLS-based suite 903 is also extended to include an operation, administration, management and provisioning (OAM&P) component 910. ~~Further information on GMPLS architecture can be found at http://www.ietf.org/internet-drafts/draft-ietf-ccamp-gmpls-architecture-07.txt.~~

Please amend paragraph **[0091]** as follows:

**[0091]** For example, signaling component 905 can include extensions specific to PBS networks such as, for example, burst start time, burst type, burst length, and burst priority, *etc.* Link management component 908 can be implemented based on the well-known link management protocol (LMP) (that currently supports only SONET/SDH networks), with extensions added to support PBS networks. Protection and restoration component 909 can, for example, be modified to cover PBS networks. ~~Further information on LMP can be found at http://www.ietf.org/internet-drafts/draft-ietf-ccamp-lmp-09.txt.~~

Please amend paragraph **[0094]** as follows:

**[0094]** Figure 10 shows an integrated data and control-plane PBS software architecture 1000 with the key building blocks at ingress/egress nodes. Data plane components in architecture 1000 includes a flow classification block 1002, and L3 (Layer 3, *i.e.* the Internet layer in the networking stack) forwarding block 1004, a label processing block 1006, a queue management block 1008, a flow scheduler 1010, and legacy interfaces 1012. In addition, the data plane components include the ingress node 710 and egress node 714 components discussed above with reference to Figure 7. GMPLS-based functionality is implemented in the control plane, which includes link management component 908, signaling component 904, protection and restoration component 909, OAM & P component 910, and routing component 906. ~~GMPLS signaling functional description can be found at http://www.ietf.org/rfc/rfc3471.txt.~~

Please amend paragraph **[0101]** as follows:

**[0101]** In important aspect of the present invention pertains to label signaling, whereby coarse-grain lightpaths are signaled end-to-end and assigned a unique PBS label. The PBS label has only lightpath segment significance and not end-to-end significance. In exemplary PBS label format 1300 is shown in Figure 13 with its corresponding fields, further details of which are discussed below. The signaling of PBS labels for lightpath set-up, tear down, and maintenance is done through an extension of IETF (internet engineering task force) resource reservation protocol-traffic engineering (RSVP-TE). ~~More information on GMPLS signaling with RSVP-TE extensions can be found at http://www.ietf.org/rf/rfc3473.txt.~~